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OHIO STATE UNIVERSITY, COLUMBUS, OHIO

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DAIRY ISSUE

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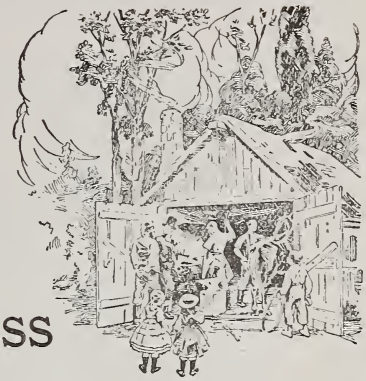

How a Blacksmith Made the Plow that Conquered a Wilderness

Put yourself for awhile in the place of John Deere, young blacksmith, giant in stature and strength, owner of a little blacksmith shop in the little frontier village of Grand Detour, Illinois, in the year 1837.

Around you stretching in every direction are illimitable prairies and muck-lands, black of soil that extends down nearly as far as a man can dig in a day. Rank vegetation covers the land, growing on hot July days so fast that you seem to see and hear the growth.

Around you, too, are scattering farmers—hardy pioneers, among the first to press westward from New England and the Middle Atlantic states—who have stopped here attracted by the promise of this land of wonderful fertility.

But there is gloom in the community. There is talk of resuming migration westward in search of a different soil, or of return towards the land from whence you and the farmers came. For the rich, black, gluey soil rebuffs every type of plow in use. The farmers are unable to put in crops.

There are frequent consultations in your little shop. The farmers know that you are a good blacksmith, and they look to you for a solution of the problem.

You tinker skilfully with the plows that they bring in—plows of wood with iron-tipped shares and iron-patched moldboards. They are the best plows the world has yet developed; they were serviceable in the light soils back home in the East; but here in this wonderful new land of locked soil-treasure, they fail in spite of all that you can do with them. Experiment follows experiment in your little shop; but still the problem remains unsolved.

Then one day a new idea develops in your mind, telling you that the necessary plow must have a steel moldboard and share, with the moldboard curved in such a way that it will scour itself as it works in the gluey soil.

No plow of the kind your imagination sees has ever been built. You have no pattern to follow. Painstakingly you carve a pattern on a log, carefully fashioning the curve that means everything.

Then, since you have no other steel, you cut a piece from an old mill-saw blade, dimension it exactly to fit your purpose, place it over the pattern and carefully hammer it with a wooden mallet until it fits the pattern lines.

Your plow bottom is done—the first of its kind ever built.

You bolt your creation to a frame that you have fashioned from white oak rails, shoulder the assembled plow and go to a nearby farm for a demonstration.

A crowd of farmers look on—some cynical, some hopeful—while you hitch a horse to the plow. You make a few final adjustments, cluck to the horse, lift up on the handles of the plow, and then, while the horse plods on and the farmers gasp, the thing which you have created voices a low, continuous whisper as the black, gluey furrow-slice turns clean and true from its moldboard. Your plow has solved the problem.

* * * * * * * * *

It was thus that John Deere planned, built and demonstrated the world's first successful steel plow, launched his long career as the master maker of farm implements, and unlocked the treasure-hold of the world's greatest agricultural region.

The hungry world is turning landward. The plow-maker is coming into his own. And the world gives special credit to the sturdy blacksmith who evolved a new plow that conquered a wilderness and inaugurated a full line of John Deere implements that leads in the work of producing food for the world.

John Deere, Moline, Illinois

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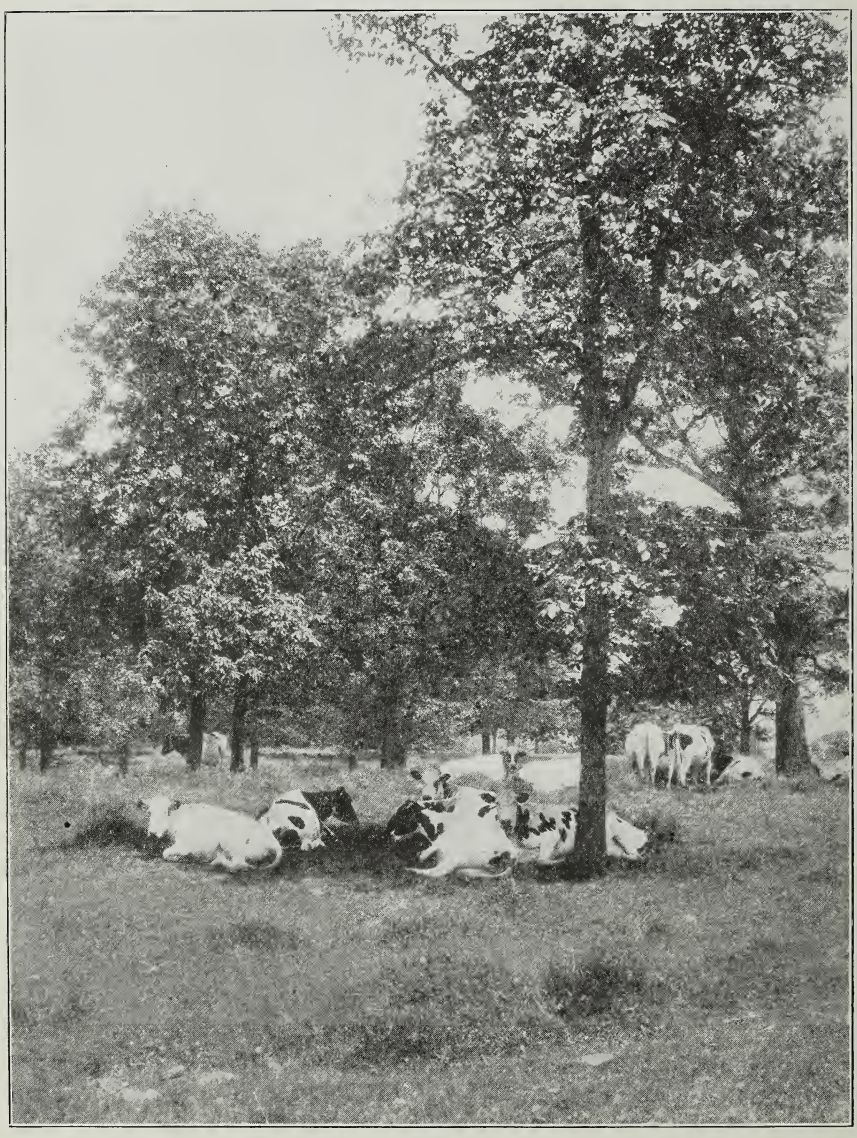


THE
AGRICULTURAL STUDENT

Vol. XXIV. OHIO STATE UNIVERSITY, COLUMBUS, OCTOBER, 1917 *No. 2*

INDIANA AND THE DAIRY COW

Factors That Influence the Development of the Industry in Our Sister State; How Cow Testing Associations Are Affecting the Interest in Dairying and Showing the Need of Better Stock.

C. R. GEORGE, Secretary State Dairy Association, Lafayette, Ind.

INDIANA needs more dairy cows. Her agriculture has developed rapidly during the past years and in the production of crops and the development of certain classes of livestock she has stood foremost among the states of the Union. During this period of development extensive agriculture has been the rule. On the good soil which carried relatively low valuation farmers found that by growing crops and either marketing them as such or by feeding them to hogs, cattle or sheep they could make a larger financial return. They could not afford to keep any class of livestock that required much labor or an intensive system of farming.

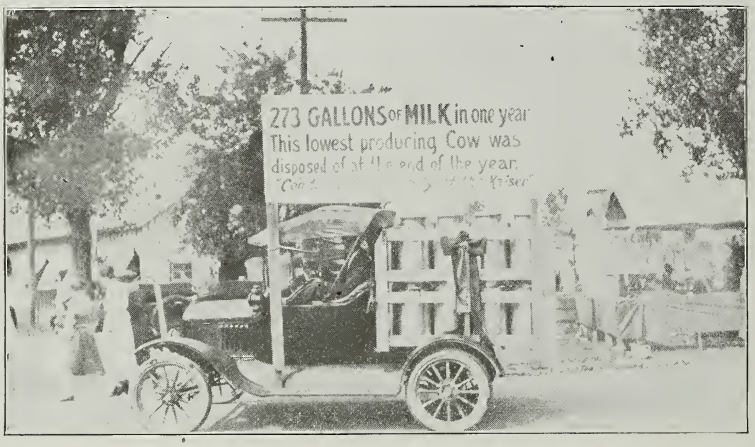
During this same period other states, such as Wisconsin, were forging ahead with the dairy cow. It was so because of necessity. As one Wisconsin farmer once replied when asked why every farmer in the community kept dairy cows, "It is the only way we can make a living off of our farms."

But all this is past history. A story of our present day agriculture is entirely different. In the more fertile sections of the state the soil is still good but it has increased so rapidly in price that different methods of farming are becoming necessary. In the regular and less valuable sections the soil has been depleted by grain farming. The farmers in these sections are coming to realize that more livestock is necessary so that they can feed their crops and keep the fertility on the farm. Either one or the other of these two conditions is applicable to practically every section of our state. Many farmers in the more fertile sections will not admit it. They like to think of their corn and hogs or corn and steers and will deny any suggestion that a change in methods is desirable. But study their circumstances. They bought or inherited land when they were young and land was cheap. Now they do not have to pay interest on high land values and it is true that they are doing about as well as usual but what of the young man who must buy his farm. This new farmer must in all probabilities go in debt for a large part of it and pay interest on its market value. This means that he must have a larger return. It will also likely mean that he will not be willing to carry such a large debt and will be satisfied with a smaller acreage. When he does this he must practice a system of farming that will enable him to do a larger business with fewer acres He must keep his soil fertile so that each acre will produce larger crops. He must not be satisfied with the single profit from his crops but he must market these crops through some kind of livestock that will make him an additional or double profit and leave the

fertility for future crops. When he gets a plan of this kind well perfected he will without a doubt have a number of good dairy cows on his farm. They will enable the new farmer to make good under these changed conditions.

This is why I stated in the beginning that Indiana needed more dairy cows. We are now at the place where the young farmers and many of the older ones are looking to the dairy cow as a source of profit and prosperity. The one big handicap in many instances is found individual farmers who have done the same thing. Their work is being watched with much interest and their success will mean more cows, more milk and more cream.

The agricultural extension department of Purdue University has been and will continue to be a big factor in this new development. Five years ago a sum of $13,000 was pledged by a number of commercial companies who were interested in the future of Indiana dairying. This sum was turned over to the university to be spent in the best



The Cans Represent the Amount of Milk Produced by One Cow

(See next page)

the cows that we already have. There are sections where cows have been kept only for the purpose of supplying milk for the family. They have not been selected for their ability to make a profit and consequently they will not do it. Nevertheless these milk cows are the best that the communities know and farmers are slow to keep more cows until it has been demonstrated that dairy cows will do more.

In many communities over the state they have already broken away from the old methods and have made a good start in dairy farming and here and there in the other communities can be interests of the industry. Since that time much has been accomplished. Cow Testing Associations have been organized in the more specialized dairy sections, feeding and record keeping demonstrations have been conducted to show the more profitable methods of dairying, auto tours and special farm meetings have been held so that the community might know what its better dairymen are doing. Boys' and girls' dairy clubs and calf clubs have been developed and promoted as a means of teaching the principles of successful dairying to the young farmers. In every section dairy meetings of various

kinds have been held and the gospel of better dairying and more dairy cows has been spread.

All this has been effective. Some communities have developed more rapidly than others but the general trend is toward the dairy cow. Crawford County, in southern Indiana, will serve as an example of growth. It has been possible to measure the results in this county because of its rather secluded location, its lack of markets, its distance from outside markets and its transportation which is limited to one railroad with 5 shipping points.

The development of the dairy business in the county is shown by the increase in the value of the cream shipped from the 5 railroad stations during these years.

Value of Cream Shipped

1913	$621.12
1914	2132.10
1915	4788.00
1916	25116.48
1917 (first six months)	21930.44

The skim milk that has been left on the farm has been used in feeding hogs and that business has increased with a bound as shown by the fact that in 1913

While This Cow Produced Enough to Fill These Cans

Five years ago this county had no commercial dairying, few dairy cows, no silos, only one or two cream separators and it grew no alfalfa, soy beans, Japan clover, or sweet clover and no limestone was being applied to the soil to make these crops possible. Throughout these 5 years an intensive dairy improvement campaign has been conducted. The work was started with a dairy train over the Southern Railroad and later a Jersey Cattle Club was organized, meetings and demonstrations were held, dairying was taught in the schools and every available force has been enlisted in the dairy campaign. only 3 cars of hogs were shipped from the county seat as compared with 24 cars during the past year.

A recent report of the Jersey Cattle Club shows that over 200 silos have been erected, about 200 cream separators have been purchased, limestone has been applied to the soil and alfalfa and other legume crops have been grown. All this can be seen on the farms of the county but the thrift that has resulted from this development can best be expressed in terms of the time deposits of the 4 county banks which have increased more than $300,000 or more than 50 per cent.

COMPARATIVE IMPORTANCE OF ENVIRONMENT AND BREEDING

Results of Experiments Conducted Upon a Scrub Herd

L. S. GILLETTE, University of Iowa, Ames, Iowa

COMPARATIVELY little experimental work has been done to show the value of good feeding as compared to scientific breeding in increasing the production of dairy cows. Every one realizes that a beef cow does not make an economical dairy animal since her inheritance is for meat production. It is equally true that the dairy cow can not attain her maximum productivity unless the environmental conditions are favorable. Hence in the highest development of dairying will be found cows bred for milk and butterfat production that are being well tended. This does not indicate, however, the relative importance of these two indispensable factors of successful dairying.

Of the various limiting factors of environment none commands the importance of feeding. While not every low producing cow can be converted into a profitable producer by good feeding, no animal even of large capacity can do her best work unless well fed. Instances are numerous where by more careful feeding—nearly synonomous with liberal feeding—inferior producers are made to yield a profit. The influence of good feeding including most of the other factors included in environment has been demonstrated in work conducted by the Iowa Experiment Station and reported in Bulletin No. 165.* A small herd of scrub cows

* The Influence of Environment and Breeding in Increasing Dairy Production, by H. H. Kildee and A. C. McCandlish.

Registered Herd on an Illinois Dairy Farm

of unknown breeding and poor feeding was purchased in 1908 and given the same treatment accorded the pure bred herd. Some of these animals were young when introduced into the college herd, and they quickly responded to better feeding while the aged cows did not increase in proportion.

Table I—Average yearly production of scrub cows that came to the station at four years of age.

No. of Lactation Period	Average Milk Lbs.	Production Fat Lbs.	Increase from First Lactation Milk %	Increase from First Lactation Fat %
1	3085	149	....	....
2	3984	179	29	19
3	4618	218	50	46
4	4908	230	59	54
5	4224	198	37	32

From the table it will be noted that the cows four years of age increased their milk production 59 per cent and their fat production 54 per cent when seven years of age. A study of 6000 Register of Merit records shows that this increase in pure bred cows, most of which presumably remain in the same environment, was 19 per cent for milk and 8 per cent for fat. In other words the environmental factors increased production of scrub cows nearly 50 per cent over that to be expected where the external factors remain the same. The influence of these factors would have been of even greater weight had the cows been bred along dairy lines. Whether under these conditions the environmental factors would have doubled the production is problematical, and of little practical moment.

The work herein noted also shows the value of the pure bred sire in increasing the production of the scrub herd; or the influence of inheritance as pertaining to milk production. Pure bred bulls in use at the college dairy farm were mated with these scrub cows and the resulting heifers were bred back to approved bulls of the same breed as were their sires. To date a number of records have been obtained on the first generation grades while but three of the second generation have completed one lactation period. The continuation of the work promises additional hope to the user of pure bred sires, as the first and second generation grades are a marked improvement over their dams except in one case. The daughters of one sire, which fortunately was a borrowed bull, were poorer milk and fat producers than their scrub dams. It indicated that this sire even though a fair individual and a pure bred, did not possess production transmitting ability. In noting the following table it should be recalled that the daughters are young cows of two or three lactation periods while none of the granddaughters have finished more than one lactation period.

Table II—Average Production of Scrubs and First and Second Generation Crosses.

	Dams		Daughters		Granddaughters	
	Milk lbs.	Fat lbs.	Milk lbs.	Fat lbs.	Milk lbs.	Fat lbs.
Guernsey	4168	186	4634	218	7091	355
Holstein	3255	161	6311	261	11295	431
Jersey	3903	186	5400	287	5479	291

In this work no attempt was made to compare breeds—an unpleasant and thankless as well as impractical task. The scrub dams mated to Holstein bulls were poorer producers than the others, which gave them an advantage when the results are studied as percentage increases. If the records for each generation in Table II be totalled it will be found that the scrubs averaged in 60 lactations 3,791 pounds milk and 178 pounds fat, the first generation grades in 36 lactations 5507 pounds milk and 248 pounds fat, while the average for

the three records of the second generation grades was 7,955 pounds milk and 359 pounds butterfat. From this the worth of the pure bred sire in a grade herd is clearly demonstrated.

Table III. Per Cent Increase in Production of First and Second Generation Grades over Scrubs.

	First Generation		Second Generation	
Bull Used	Milk	Fat	Milk	Fat
Guernsey	11	17	70	91
Holstein	94	62	245	168
Jersey	39	54	40	56
Average	45	39	110	102

Doubling the production of the scrub cows in two generations by the use of pure bred bulls is indicative of the importance that must be attached to breeding in dairy production. The first generation grades carrying 50 per cent of the blood of their respective breeds averaged an increase of 40 per cent over their dams, a figure that was decreased thru the use of the poor sire previously mentioned. A continuation of the work is expected to strengthen the claim heredity has already proved in developing milk production.

The work at the Iowa Station denoted that in the case of nondescript bovines, fitted with no type of any kind and a pedigree that does not warrant close scrutiny, careful attention coupled with liberal feeding increased their production some 50 per cent. It may be further shown that thru the use of sires, of known dairy type and breeding, the increase may reach and even surpass 100 per cent in two generations—a remarkable tribute to the power of heredity ill adapted to use by dual purpose enthusiasts. I believe that as the power of milk production becomes augmented by constructive breeding, the value of favorable environmental factors increases proportionately.

Permanent dairying must be profitable. Profitable milk and butter production is found only in herds of uniformly high producers. These cows must have the breeding as a working basis upon which the herdsman practices his art and the result indicates the skill with which the animal is handled. If either is wanting or only partially present the results will be disastrous and dairying fall into discard.

To attain the breeding is the more difficult task of the two since it requires more time if not more knowledge, while the results of feeding are quickly and easily seen. In selecting a herd sire in the light of this work, due attention may profitably be paid to the environment in which his dam and daughters have been tested. The reputation of many great dairy bulls has been sacrificed because of environmental handicaps over which they exerted no control. The number of daughters in the Advanced Registry may be more of a tribute to their caretaker than to their sire. Likewise it is equally important to know the production of a sire's poorest daughters as that is also indicative of his ability. One criticism of our Advanced Registry which is not likely to be met for some time, is that it makes no provision for recording the records of the poor daughters of a sire. A sire's value is determied by his ability to produce daughters capable of excelling their dam's records under equal environmental conditions. The influence and importance of these must be appreciated by the dairyman seeking to improve the breeding and productivity of his herd.

FOOD ADMINISTRATION AND THE FARMER

A Survey of the Situation and the Proposed Solutions

HERBERT HOOVER, Washington, D. C.

INTELLIGENT coordination of all the forces in the country to solve the specific food problems which have been imposed by the international situation is the objective of the food administration. Most of the food problems which have arisen in the United States and which will arise in the future, would have occurred even if we had not gone into the war. They are based upon underlying economic currents and disturbance of economic forces. The solution of these difficulties depends entirely upon the cooperation of all concerned. Our entrance into the war makes their solution more simple than would have been otherwise possible because we can now summon to our aid patriotism and devotion in a greater degree.

Herbert Hoover

With the diversion of millions from productive labor to war the food production of our Allies has been greatly diminished, and we find the present harvest of our European Allies 525,000,000 bushels of grain below normal. Dependence is placed upon North America to make up this shortage. To do so this country must export 220,000,000 bushels of wheat as against our normal export of 88,000,000 bushels. In addition, we must furnish them with 400,000,000 bushels of other cereals as against our normal pre-war export of less than 50,000,000 bushels. The greater demand for meat and the shortage of fodder has caused heavier inroads upon European herds. Because of the submarine menace and reduction of shipping only the most concentrated foods are being shipped; hence it is more logical for them to kill and eat their animals and depend upon us to replace their animal foods than it is to import foodstuffs in hopes of maintaining their animals.

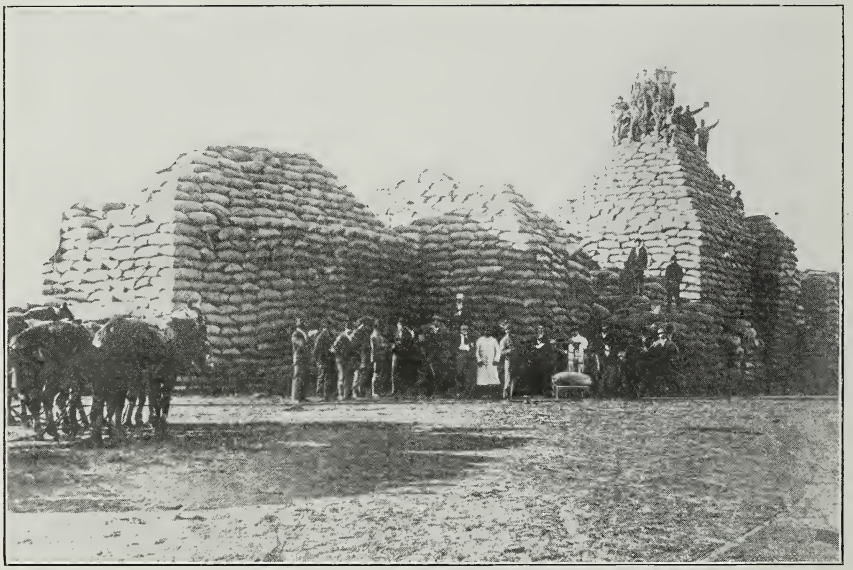
The allied countries have used almost every practicable means of reducing the consumption of foodstuffs and eliminating waste. But reduction of consumption does not bear uniformly upon the entire population. The soldiers at the front, the workers in the shops and on the farms, require a larger percentage of proteids and fat. Therefore, restrictions in consumption must necessarily fall upon women not engaged in physical labor, the aged and the children.

With such conditions existing among our Allies we face a two-fold duty. We must lend whatever agencies we have toward increasing our own crop production and at the same time relent-

lessly strive to eliminate waste so that we may provide the margin of foodstuffs required by our Allies.

The gradual destruction of animal food supplies in Europe makes it imperative for us to increase our supplies proportionately. This means that with less demand for our fodder grains, Europe can turn her production after the war toward food grains. With the shortage of ships it is necessary to practice greater economy in shipping space; and that economy can best be practiced by the further concentration of our shipments of food supplies to Europe upon animal foodstuffs. This will not end with the war. Every American producer must eventually realize that in his own interest, in the interest of the nation, and in the interest of the war, agriculture must look toward increased production of animal food and the ultimate decrease of our exports of bread and fodder grains.

We have not lacked ample supplies in this country, yet the shortage in the world's food supply has made itself known to every household in the land. The greatly increased foreign demand caused an increase in the price level. One outcome of this has been the growth of vast speculation and an unnecesarily higher cost of living. Figures for 1916 show that the farmer received less than $1.50 per bushel for his wheat yet he and the remainder of the consuming public bought their flour based on a price of over $2.50 for a large part of the year. This is but one instance, for these unnecessary margins are not confined to wheat alone. If we are to protect our people and at the same time maintain our efficiency in the war, we must find some remedy for these evils.



Wheat Ready for Shipment to Our Allies

Supplies in the world's larder are below our combined necessities—a situation that can only be met by reduction in consumption and by the elimination of waste. Due to the shortage of ships our shipping must be confined to the most concentrated foods. This year's progress of supplies to our Allies must consist largely of wheat, beef, pork and

dairy products. We have an abundance of many other foodstuffs which may be substituted for the concentrates needed for export. Reactions of shortage in oversea transports do not affect our European Allies alone, for we also import vital commodities in the form of sugar, vegetable oils and other necessary supplies. We thus have a problem of our own, for we must reduce our consumption of sugar; and we must restrict the demands of the speculator, or else only those who can pay the price will have these necessary supplies. An embargo was placed upon the shipment of food and other commodities from this country because of an unlimited drain from our supplies is permitted we will face an unaccustomed shortage next spring. A monthly survey of our position will be taken to see that we are allowing through this embargo only what we can spare.

Before the creation of the food administration we faced the following problems: if we were to trust simply to the ordinary course of supply and demand to determine price levels in this country, not only of foodstuffs but of all commodities, we were faced with inequalities of distribution. We were faced with the possibility of undue drainage from our supply into the European vacuum and ultimate total shortage of our necessities. We were faced with rampant speculation, which unless it were curbed or destroyed would squeeze millions from the misery of our people. It was necessary that production be stimulated in order that we might supply not only our allies but our own people. It was vital that we obtain a reduction in consumption and in waste. These are the reasons for the creation of the food administration.

The solution of the breadstuff problem was the first one undertaken by the food administration. This presented difficult phases because the customary practices of price determination in wheat were entirely destroyed by the disruption of the world's commerce. While we faced on one side, shortage of supplies, such shortage might have been extinguished overnight (due to solution of submarine problem or peace) by the flood of supplies from Australia and India. The number of buyers in our markets and the ordinary equalization of price with the supplies of the rest of the world have disappeared. In addition to these things speculation in this particular commodity during the last year was one of the most terrible burdens our consumers had to bear.

No half-measures were possible to protect both the producer and the consumer. As a result the President summoned a commission composed of the best intelligence of the country, representing in actual majority the producers themselves, and laid upon them the important duty of determining what would be a fair price for this year's harvest with a just return to the farmer.

This commission fixed a price of $2.20 a bushel for the 1917 crop of wheat. The price differentials are: No. 1, dark hard winter, $2.24; hard winter basic, $2.20; red winter basic, $2.20; yellow hard winter, $2.16; soft red winter, $2.18; dark northern spring, $2.25; red spring, $2.18; humpback, $2.10; amber durum, $2.24; durum basic, $2.25; red durum, $2.13; red walla, $2.13; hard white basic, $2.20; soft white, $2.18; white, $2.18; white club, $2.16; No. 2 of each grade, 3 cents less; No. 3, 6 cents less; No. 4, 10 cents less.

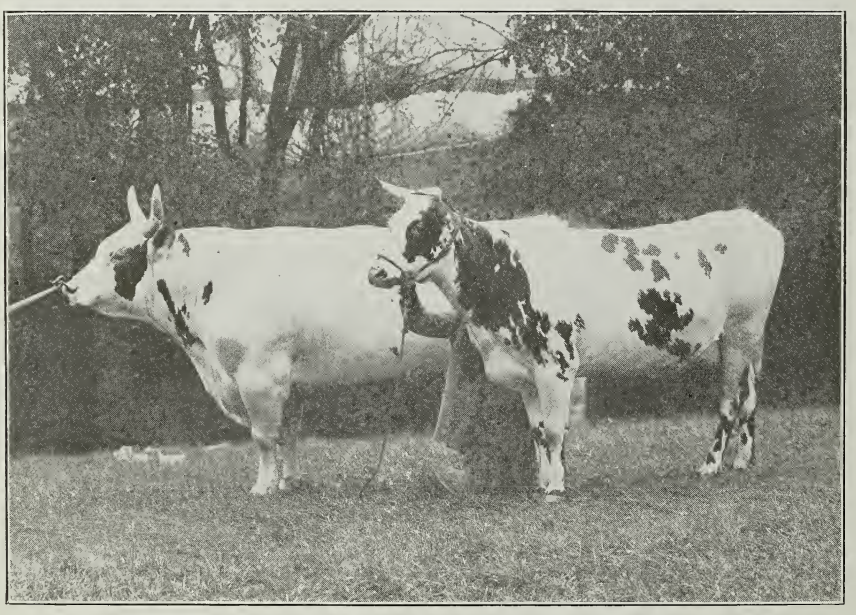
Although the prices are fixed on government purchase only, the food administration, through its wheat corporation, expects to control the market without difficulty. This corporation

was organized because government accounting and finance is ill adapted to the conduct of mercantile business. It is being operated by volunteers—by men who have entirely dissociated themselves from the business of grain trading and given their services to the government for the war. The corporation is operated without one cent of profit for the government.

Every commodity is a case unto itself and requires a different treatment and organization. From all parts of the country the food administration has summoned men and women who are leaders in knowledge, experience and skill in dealing with some special problem or phase of a problem. With their best advice, and in conference with people engaged in these special activities, an endeavor is being made to find a remedy for the evils which have grown up, and in each instance to find a method of administration that will ameliorate those evils.

The cost of the war and the inflation which must grow out of its finance is another economic force which must be met. Because of these facts the prices of commodities will probably rise steadily thruout the course of the war. The best that the food administration can hope is to guide the relative increases in order that their disproportion shall not cause undue hardship and that they shall not give opportunity for rampant speculation.

Democracy can voluntarily organize itself from the bottom up. By inspiration as to the problem with which it is confronted and as to the methods by which they may be solved, by self-imposed discipline, by self-elected leadership and organization, it can find the solution and defend itself. This is the ideal and intention of the food administration. If we fail on this line, we fail because democracy does not possess the efficiency to defend itself.



In the Cheese Making Section of New York State

METHODS OF FEEDING HIGH RECORD COWS

Proper Attention to the Rations Produces Profitable Results

K. L. JUVE, Superintendent of the Cleveland City Farms, Warrensville, Ohio

WE begin to fit our cows for test work about 3 months before freshening. We believe that half the record is made during the period she is standing dry—although we have had cows freshen while they were milking as much as 20 lbs. per day and they still produced very well for the year.

Great care is taken with the cow when she is being "dried off," so that her udder will be in the best shape when she freshens. If the cow is milking between 30 and 40 lbs. per day when it is time to dry her off, she is milked twice a day but the udder is not stripped out. The leaving of the strippings in the udder at this time is not injurious, but helps to lessen the secretion. When she is milking about 15 lbs. a day she is milked once in 24 hours, but milked out clean. As the milk flow diminishes she is milked irregularly—that is, in the morning one day and in the evening the next. When milking but 5 lbs. a day, one day is skipped and then two days and when she is only giving from 1 to 2 lbs. of milk in 3 or 4 days very little attention is paid to her, as her system gradually absorbs the milk that remains in the udder.

The ration fed during this period is composed of: 100 lbs. bran, 100 lbs. oats and 50 lbs. oil meal.

Very little silage is fed—merely enough to keep the bowels in good condition. It has been necessary in a few cases of very persistent milkers to starve the animal. Nothing was given then to eat from 24 to 48 hours. It has also been necessary during this period, to stanchion them as they would become so hungry that they would eat up their bedding. When the cow is absolutely dry she is put on the following fitting ration: 150 lbs. bran, 100 lbs. oats, 100 lbs. gluten, 150 lbs. oil meal and 40 lbs. hominy or cornmeal.

For heifers coming fresh for the first time, 60 lbs. of hominy is added to this ration. Ensilage and alfalfa are fed 4 times a day along with the grain. Heifers will eat between 15 and 20 lbs. of grain a day and cows between 20 and 25 lbs., and in some cases more. Now is the time when the likes and dislikes of a cow are found out. Some cows like to eat the grain first and then beets, beet pulp, silage and hay. Others like the silage first and others the beet pulp. If these peculiarities are noticed it saves a lot of time and worry when the cow freshens.

A few days before calving, beets or mangels are fed—we find them very beneficial in regulating the bowels. If the bowels are not in a good loose condition one-half pound of Epsom Salts is administered. Luke warm water is given (if in winter), 24 hours before calving. Directly after calving a pail full of warm water is given and the cow blanketed. In about one hour a warm bran mash is given. Ten hours from the time of calving, a small feed of beets, bran and a hand full of oil meal is fed. If she eats this up readily a small allowance of silage is given and then some bright alfalfa hay. Particular notice is taken at this time as to the condition of her bowels and if there is the slightest tendency toward constipation one-half to three-fourths pound of Epsom Salts is given. A large dose of salts at this time would be injurious as she is now in a weakened

condition. Warm water is given her liberally until the placental membranes come away. The udder is not milked out dry until the calf is taken off, which is usually when it is two days old. This, we find, is a very good preventive for milk fever. After the placental membranes have come away, the calf taken off and the cow eating all that you have given her, the bran and oil meal is gradually replaced with the test ration—starting in with from 4 to 5 lbs. saged well after every milking. In about one week the cow should be eating at least 20 lbs. of grain per day, along with beets, ensilage, beet pulp and hay. The amount of beets and ensilage fed is entirely dependent upon the cow's personal taste and the ability of the feeder to have her consume large amounts of these feeds. We have had some cows eat as much as 90 pounds of beets per day, while others would consume but 40 pounds.

Jolie Topsy Pauline DeKol

of feed for cows and from 3 to 4 lbs. for heifers four times a day. The test ration will vary, acording to the different feeds available and also to the individual cow. We have found the following test cow ration to be good and we are using it at present: 200 lbs. bran, 200 lbs. dried distiller's grain, 150 lbs. gluten feed, 125 lbs. Unicorn Dairy Ration, 125 lbs. oats (ground), 100 lbs. oil meal, 100 lbs. cotton seed meal and 15 lbs. salt.

If the heifer's udder is caked, she is kept on bran and oil meal, but the amount increased. Her udder is massaged well after every milking. In about one week the cow should be eating at least 20 lbs. of grain per day, along with beets, ensilage, beet pulp and hay. The amount of beets and ensilage fed is entirely dependent upon the cow's personal taste and the ability of the feeder to have her consume large amounts of these feeds. We have had some cows eat as much as 90 pounds of beets per day, while others would consume but 40 pounds.

The amount of grain fed is now increased gradually and changes in her physical condition, excrement and milk secretions, are anxiously watched. If a 7 and 30 day record is to be made, the feeder now uses every precaution not to get her "off feed." The cow is kept just as hungry as possible, but still consuming large quantities of feed. While the 7 and 30 day test is in progress she does not go out of the barn for exercise, but after these short records are finished, daily exercise is given her, weather permitting. After the short time tests have been run, should we de-

cide to put her on yearly work, the grain ration is cut down and very seldom do we give a cow in long time test over 25 lbs. of grain per day. Jolie Topsy Pauline De Kol (see picture) was one of the exceptions, as she is a very large animal and has the constitution to take care of large amounts of feed. She received on the average of 28 lbs. of grain per day while on her year's record, when she made her 25 lb. butter record, 8 months after calving, from 556.9 lbs. of milk—the amount of grain fed being increased to about 30 lbs. per day.

All test cows are watched very closely at feeding time and if a cow does not clean up her feed readily it is immediately taken away and a thoro physical examination is made. Her temperature is taken, color, odor and quantity of faeces is noticed, brightness of the eye and respiration is also carefully noted and should the diagnosis indicate a slight attack of indigestion, one-half to three-quarters of a pound of Epsom Salts is prescribed, the dose depending upon the size of the animal and the findings on examination. The next feeding is generally skipped, unless the cow shows unmistakable signs of wanting something to eat and very great care is taken not to give her too much feed. If we cannot get a cow back "on feed" within 24 hours, our veterinarian is always called.

All cows on 7 or 30 days tests and some others in year work are milked four times a day—4:30 and 10:30 both before and after noon. Fifteen minutes before milking, the cows are fed grain and beets or grain and beet pulp, the order depending upon the individual. When she has begun feeding we aim to keep her eating—that is, when she is through with her grain and beets, ensilage is given, then hay as soon as the ensilage is cleaned up. By the time the cows have finished eating their hay, the milkers are back from breakfast. The cattle are now groomed and turned out into the exercise lot and those that have to be exercised by walking are led. The work is so arranged that in a couple of hours the test barn is thoroughly cleaned and bedded, after which the cows are put into their box stalls and left undisturbed until milking time. The barn thruout the remainder of the day is kept as quiet as possible so the cows will get absolute rest. The milkers have feed to mix, or some other chores which keep them busy until the 10 o'clock milking. After dinner these men are off duty until four thirty. One man is in the barn all day to pick up manure and watch for cows that are about to calve. A man is also kept in this barn at night for the same purpose.

In conclusion I wish to say that the feeder and milker of test cows must have an interest in the work and be willing to put in long hours when needed. Above all they must be regu lar both in feeding and milking, kind, patient and use good judgment at all times. With such men in direct charge of test cows, creditable records can be made.

MAKING PIMENTO CHEESE

Complete Explanation of This Process Which May Be Made a Profitable Side-line on Many Dairy Farms

R. W. SMITH, '17, Ohio State University, Columbus, Ohio

MAKING pimento cheese offers an excellent opportunity for utilizing the excess milk supply on the farm especially if the farm is located near a city or large town or has a milk route among retail customers. It is an article which is easily made, requires little equipment and usually finds a ready demand, provided that the customers learn that they can depend upon getting a good product.

In making the cheese we found that pasteurized milk gave the best results. Pasteurizing can be best done on the average farm by simply taking the 5 or 10 gallon can in which the milk is usually kept and placing it over a heater or on the stove. Heat to 145 degrees and hold at that temperature for 30 minutes. Then cool as quickly as possible to 70 or 75 degrees.

This is about the right temperature for adding the rennet and starter. The starter is the usual lactic acid starter used for butter making. Add 1 quart bottle of starter for every 10 gallons of milk. The starter can be carried along indefinitely by adding 1 or 2 teaspoonfuls of the culture to every quart bottle of skim milk each day and keeping this at a temperature of from 70 to 75 degrees. Rennet can be obtained in either the tablet or liquid form. The tablets are sold at drug stores and printed directions for use will usually come with them.

After adding the rennet and starter, stir the milk thoroughly for several minutes and set aside for from 15 to 20 hours at a temperature of 70 to 75 degrees. We made our cheese in the basement during the winter and were able to keep the milk at the required temperature by setting near the fur-

Registered Ayrshires on a Wisconsin Farm

nace. After about 15 hours run the finger through the curd in the can and if it breaks evenly it is ready to drain.

We made a draining rack in a few odd minutes which saved considerable time over the common method of tying in sacks. Two narrow boards about 8 feet long are nailed a foot apart by means of two cross pieces at each end. Short nails are driven through the under side of these boards every 12 inches coming through about an inch. Cheese cloth bags with openings 1 foot square can be slipped over the ends of the nails.

Dirt can be kept out of the curd by means of another rack made the same size as the former but covered with cheese cloth. From 12 to 20 hours will be required to drain the whey from the curd depending on the thickness of the bags and the nature of the curd. The curd should be shaken once or twice during the draining period to insure even drainage.

After draining, empty the curd into a large pail and add pimentos, which have been ground fine, at the rate of 1 quart to every 15 pounds of curd. Add 4 or 5 ounces of salt to every quart of pimentos. The salt can be mixed better with the curd if it is added directly to the pimentos.

After mixing the pimentos thoroughly with the curd, run the mixture through a meat grinder using a fairly coarse knife. In case of a lumpy curd it will probably be found advisable to grind twice. A 6 ounce jelly glass is the most convenient size to use, although when the cheese is to be delivered to a restaurant or wholesaler a jar can be used more economically and with less labor in filling.

The glass should not be filled to the top because of the danger of some running down the sides of the glass after it is wrapped. Circular pieces of parchment paper, cut a little larger than the diameter of the top of the glass and used between the cheese and the lid will keep the cheese from getting on the cover and will also make the cover fit more tightly.

After placing the lid, we always inverted the glasses and dipped the top in melted paraffine to a depth of about half an inch, removing it quickly. The paraffine cover helps to exclude air. A neat appearance can be given by wrapping the glasses in parchment paper which bears suitable lettering on the outside such as "Elmhurst Pimento Cheese, Made from Pure Pasteurized Milk." Even if you have a small plant, give your cheese a name for if you do any advertising this is essential. A gummed label placed on the outside of the glass is probably easier to use than the parchment paper and will remain on the glass while it is in use. The cheese must be kept cool at all times and special care is necessary during the hot summer months as the cheese will spoil quickly at a high temperature.

The initial outlay need not be large. In purchasing supplies, it is advisable to buy in as large quantities as possible because a considerable saving can be made by doing so. A common meat grinder of large size can be purchased for about $3.00. Six-ounce jelly glasses will cost about 15 cents a dozen, imported Spanish pimentos 15 cents a pint and printed wrappers about $2.00 for the first 500. In some communities these costs will average a little higher and in others lower.

DAIRYING IN TENNESEE

How the Cow Is Becoming an Important Factor in Southern Agriculture

C. ELMER WYLIE, University of Tennessee, Knoxville, Tenn.

EVERY true dairyman has in his mind some state which to him is the center of all dairy activities. In every case he recognizes that the differences between states are based not only on individual dairymen but on conditions surrounding them. The big problem of each dairy farmer is not the selection of good cows for the Babcock test is a definite solution to this problem. The big things he must deal with and which are not altogether under his control are such factors as climate, water supply, crops and feeds, markets, machinery and labor. Whenever he can so adapt himself to make the greatest use of the natural conditions of his neighborhood he is in a position to start business on a dairy scale. The object of this article is not to bring out the advantage of dairying over other types of farming, but to show its relation to a certain section.

Tennessee has long been famous as a dairy state in the south. The dairymen of this state have an entirely different problem to solve than that of any others in the Union. Although it claims 400,000 dairy cows, still the industry is in its infancy in development and organization. There are but 9 creameries in the state and a number of these have been organized within the last 2 years. The first cow testing association was organized in the state in January, 1915. There are now 11 associations. This is an indication of the impetus to dairy development that will result from this first key to successful dairy farming. Once the farmer learns that good cows really mean money to him he begins to handle the herd as a business proposition. It is true that the state lays claim to not only some of the best producing herds of the country but to show stock as well but the state as a whole does not rank high in these respects. Knowing the condition of the state and the age of its dairy development one can realize that it will some day hold a high place among the recognized commercial dairy states. Tennessee is perhaps the only state that has a long extent of territory lying far enough north to escape the hot weather of the states that border it on the south, and it is not far enough north to be affected by the cold winters of the northern states. This advantage makes a much more simple problem of housing cattle in the winter as it is not necessary to make a large outlay of money in order to protect them. The cattle not only require less housing in winter but less feed to maintain them.

In the summer the pastures thrive well and the season is long thus enabling the farmer to grow a second crop on the land. For example, corn for silage may be planted after wheat is harvested. This is indication of the length of season which seems impossible to the northern farmer. The climate is remarkably healthy for cattle and tuberculosis is rarely found. This is due not only to the extensive outdoor life but to plenty of pure water and to the drainage of the land.

There is perhaps no section of country which furnishes such a natural advantage of abundant spring water. This is not only the best in the summer when some sections are suffering

from drouth but it flows the year around so that the winter water supply causes little difficulty. These springs are also of much importance in handling the milk after it is taken from the cow. Dairymen know that sweet milk is essential to a profitable business and that this is based largely on their ability to properly cool the milk. The problem of cooling is reduced to the minimum of both time and labor with the cool running spring water in which the milk vessels may be placed immediately after milking time. It is true that the days are warm but this is more than overcome by the cooling process with the spring water immediately after milking for it is at that time that cooling is most necessary. Once it is cooled and the growth of bacteria retarded it takes considerable exposure to the sun to set up active fermentation.

The present demand for milk indicates the same shortage of cows that is found all over the country. A large majority of the cows are grades and scrubs carrying Holstein and Jersey blood but there are about 250 pure bred herds in the state. The Holsteins stand next to the Jerseys in numbers and are making rapid progress not only in the establishment of new herds but in the development of those already established. Most of the herds are small but the largest ones are managed on a commercial basis for their existence. Official testing has not reached the point of development to best serve the interests of the state. Those few herds which can show official records of production are now supplying cattle to all the southern states. The demand is so great for this kind of Tennessee stock that many of the dairymen are buying officially tested cows from other states

Tennessee is Famous for Her Jerseys

in order to get an early start in breeding work.

The people of the south consume large quantities of ice cream and Tennessee furnishes a larger portion of this than any other state. This uses the dairy products at the time of year when there is a tendency toward a surplus. The ice cream season is so long that this form of dairy product is a source of large income to the industry. There are a number of commercial ice cream plants in the state and several of these follow the common practice of making a large part of the ice cream from sweet butter. The weather determines very largely the demand for ice cream and thus the demand fluctuates considerably. To have an adequate supply of cream is quite difficult as it does not keep long in warm weather. It is more bulky so that butter may be shipped with safety for a greater distance than cream at a lower cost. Most of the butter shipped into Tennessee for ice cream comes from northern states. Every year a large amount of butter, cream and milk must be obtained outside the state in order to supply the home demand for the products.

Although there is a scarcity of labor, help can be obtained at a much lower price than is paid in the states farther north. During the past year the use of the milking machine has increased greatly but it has not been in use long enough to determine how well the dairymen will like it or to predict its further use.

For several years the feed problem has been growing more important but it has not caused the trouble experienced by many dairy states. Cotton seed meal is used quite extensively and this furnishes the cheapest source of protein as there are no charges for transportation. It is fed in amounts up to 4 or 5 pounds per day especially when used with corn silage. By combining it with velvet bean meal, another southern grown feed and with corn, oats, barley and wheat bran a splendid home grown ration may be obtained. Silage has already been mentioned as a roughage. This is used with alfalfa, crimson clover, crab grass, orchard grass, soy bean and cowpea hay. Cotton seed hulls are widely used as a feed and are sometimes regarded as a concentrate when mixed with blackstrap molasses. In this form it is quite palatable and is very cheap as it contains about 33 per cent. carbohydrates.

On the whole the outlook for the dairymen is quite encouraging. A relatively lower cost of production with a good demand for the product makes it posible for the small dairy farmer to make a success in this state. There is a great field open to the breeder doing official testing not only in serving the dairy interests of the state but in doing a profitable business.

PUTTING DAIRYING ON A BUSINESS BASIS

WENDELL P. MILLER, Ohio State University, Columbus, Ohio

IT is a sociological principle, that the laborer is entitled to a living wage, but under the principles of management practiced by many dairy farmers of the present, these farmers do not make a good living from their business. The ordinary dairy farmer is unique in that the workman and business man must be combined into one for the greatest success. This is a principle that many farmers are slow to recognize. Too often the dairyman tries to make muscle alone carry him to success, resulting in disappointment in the enterprise.

What Do You See Coming?

Dairying has become a manufacturing business, but the dairyman often does not follow business methods. The producer of iron rails feeds the raw materials into his plant and turns out the products at a price that will pay for his labor and leave him a margin of profit. He closely watches his business and discards everything that is not efficient. Dairy farmers would do well to copy the methods of the manufacturer. The cows are the machines and if they do not convert enough raw material into the finished product they must be discarded and more efficient ones sought.

Dairying has not been profitable in the past. Dr. A. L. Thompson, who made a survey of 174 farms in Delaware County, New York, found that the average cow in this district did not pay for herself by $32.14. His figures show that dairying is not yielding the profit it should. These farmers are not merely working for fun. In the past they thought they were making a good profit. It took accurate figures to show them the actual status of their business. If a man takes his money to a bank, he will complain if the bank does not return him a fair rate of interest. This same man may feed his cows at a loss without a word of complaint. The only difference is that the bank keeps a closer record of the farmer's business than the farmer himself.

It has been said that the dairy cow is one of the greatest enemies of the country church. Dairy farming is said

to be unfavorable to social development in the United States. This may mean that those that engage in dairying are so ambitious that they voluntarily give up all social life. It may mean also that they are compelled to do so by the very nature of the enterprise. In either case it is not a desirable condition for it cramps the lives of those engaged in the industry, and does not afford opportunity for the development along social lines that is the right of every man.

Dairying is looked upon with disfavor by hired laborers. Many farm hands make it distinctly understood that they are unable to perform the simple task of milking. Has the reader ever followed a plow all day or pitched hay under a burning sun and then at night sat down to milk the cows? If so he will remember how it was, how the flies furnished music for the occasion, and how old bossy, forgetful of the milker's presence, would attempt to shoo them away with foot or tail. No wonder dairy farms are looked upon with disfavor by hired men when they are expected to help milk in addition to the day's work.

These things all point to the fact that dairying must be made a business. The demand for its products is constant. As conditions exist the supply of dairy products is subject to great fluctuations. The farmer uses his own feeds and if he runs short, buys as he needs them. If feed is high he probably feeds little. Such methods are not business like, so it will be a blessing for the dairymen when men of this type quit the business.

Dairying requires the greatest organization of any of the agricultural enterprises. Guesswork has no place in it. From the feeding of the dairy calf to the making of commercial products, the dairyman must know and not guess. As people come to demand first class products, the truth of this becomes more evident.

Some may say that it is merely a dream to think of putting dairying on a business basis. Holland and Denmark, the foremost dairying countries of the world, make dairying a business. It is well to note that they have not cramped themselves in a social way. The schools and social life of rural Denmark are of the best, a condition to be traced to the fact that they maintain only high class dairy animals and use business methods.

Of what does business-like dairying consist? In short it means an accurate knowledge of cost in relation to production and an application of this knowledge in management. Net returns may be influenced in many ways, among which are markets, wisdom in feeding, and efficient application of labor and capital. The returns must be large enough to enable the dairyman to maintain his laborers properly. Until then high class labor so necessary for successful dairying will not be attracted to the industry. The men must not be expected to attend to the dairy after a full day's work. Some arrangement must be made whereby they can be made to feel that they are not tied down to the job as this is the greatest objection men have to dairy farming.

These things form problems in management not yet worked out, and it will take a long time to solve them satisfactorily. The solution may mean a larger outlay of capital, and it may mean larger dairy farms. Above all things it will require more cooperation than we have seen in the past between producer and consumer, employer and employee and among the dairymen themselves.

COLLEGE BOYS AND DAIRY CATTLE

What Holsteins Are Doing to Help Pay School Expenses and Train Future Dairymen

HERBERT J. RUCKER, Blackburn College, Carlinville, Illinois

WHY did the cow jump over the moon? In looking closely into the development of the dairy cow, and the many uses to which she is put, we have discovered the true answer—to give some boy a college education. That ideal is worthy of any cow's ambition, so we have placed in our annals, the names of cows in nearly every state that are playing just this part in the development of civilization; and what perhaps is pleasing to all of us, is that you do not have to go far outside of your own state to find a herd of Holsteins that work the whole year, so that a number of boys, (and girls as well) can go on with their learning.

View of Government Dairy Experiment Farm, Beltsville, Maryland

The "Blackburnia" Holstein Dairy Farm, is a part of Blackburn College, Carlinville, Ill. The part it plays is to furnish a portion of the board for some ninety "self help" students, as well as to furnish the place where these same boys can work some time each day to help pay for their board and schooling.

Now because we operate a college farm, do not think that we have the finest of barns and houses, the finest of livestock and implements with which to work. They are always desired by all, but would not be true to our conditions. We are located in the southern third of Illinois, where the land is a bit thin, where the progress of scientific agricultural education has been slow, so we have our farm operating with about the same equipment as has the average farm in our county. Our problem is to improve the farm, so while solving it we are giving some hundred or more boys this experience, which they will use to improve their own farms, or farms which they will operate.

Perhaps the best way to tell you of the association of the student and the dairy would be to have you go with me

on a trip with three boys. The alarm tingles a bit before 5 a. m. and in a few minutes we see coming from the dormitory three young men dressed for the occasion in overalls and blue shirts. I wish that you might follow these boys. One of them does the feeding, the others do the milking and care for the cows.

No student so far seems to think the feeding a "snap." Every bit of feed, grain, hay and silage is weighed before it is given to each cow. A record is kept of the amount fed at each feed, and at the end of the week these amounts are charged to each cow's individual account. A milking record is also kept for each cow. This record, like the feeding record is a weekly report so at the close of a week each cow is credited with her production.

Besides the feeding and milk records we also keep account of the amount of time spent in caring for and feeding our dairy. An estimation is made and charged to the individual records, so by an examination of our books we are able to determine which of our herd are paying for their board, and which are making the most profit for the school. Our policy is to gradually bring into our herd better cattle and this is the only successful way we can determine the poorest paying members. What more of a verdict should a cow receive before she bids farewell to the Blackburnia farm?

We have men smile at our methods but by it we have weeded out 5 non-paying members and have brought in others that are better payers. It doesn't take much time to keep these records. With our system it takes approximately 5 minutes a day, a half hour a week, two and a half days a year, and that 5 minutes a day will mean to every farmer more than ten times its earning power each year. We are not able to give full details of our plans here, but should any one wish more information write us and we will gladly answer your questions.

Farm Demonstration Meetings Are Helping the Dairymen

Especial care is given the cows and calves while they are in winter quarters. Every day they are curried and we are now realizing the profits of our labors. Before we began to handle our herd this way they were nervous when any one came around, and would shy from us while in the pasture. Now

they are quiet and can be handled in the pasture as well as in the barn. The student soon learns that kind treatment to dairy cattle is essential.

From the first of November to the first of May our cows are in the barns, being turned out for water and exercise in the warmest part of the day. We believe that a water-tank heater is essential to a successful dairyman. After having installed ours, we would never be without one. Severe cold spells do not cut into our milk supply as they did when the cows had to drink the icy water. We have not had the cases of compaction from lack of water as we did prior to its installation so we heartily recommend any one to place the tank heater in their list of necessary equipment.

The question of how much feed each cow should receive comes up time and time again, so we go to work on a somewhat definite basis and gradually work from it until we feel that we have the right amounts. To begin with each cow receives from 25 to 30 pounds of silage, all the clover she will clean up which is about 10 to 12 pounds and then while in milk one pound of grain to each 4 pounds of milk she produces. The grain is the variable amount and we increase this as long as we secure an increase in milk flow. When there is no longer an increase we lower the amount until we find that the milk production is decreased, then we add just the pound to the last amount. This will be the amount of feed she will receive for about a month when we will test her again with a change in quantity. We sometimes test out the quantity of silage in the same way but always have the clover hay before them and let them eat what they will. The grain mixture that we feed is ground corn and wheat bran mixed in the proportion of 2 to 1 by weight. Having our own grinder we can mix up any quantity that we wish.

The feeding of our calves is another interesting experiment. We advocate, from our own personal experience, using whole milk and gradually tapering off on skim milk during the first 60 days of the calf's life. Then other feeds can be used. (Ill. Circular 202 describes this method of raising calves.) We attempted to raise a grade calf this past spring, using a commercial feed which was supposed to take the place of milk. From our results we advise you not to make the same venture. The feed is good if fed with the skim milk after the calf is old enough to do without the whole milk. You can not help but grow stunted, "pot-bellied" calves when fed commercial feeds alone.

Not only does the dairy student secure the experience of feeding and caring for the cows, but he also learns how to test for butter fat. Each month during the school year a 3 day test is made for each cow. A composite sample of 6 consecutive milkings is tested and then with the monthly record we know how much butter fat each cow produces. Two individuals in our herd were receiving the same feed and were about the same size. One was giving two gallons of milk more a day than the other; but when tested out, she gave less than three-fourths of a pound of butter fat a month more than the other. The difference in values of the two were not so great when we discovered the real worth of each.

Manure made by the dairy is hauled directly to the fields, so we can secure the greatest amount of good from it. Our farm is increasing in its yields from its use. This year is our best as our silage has nearly doubled in yield.

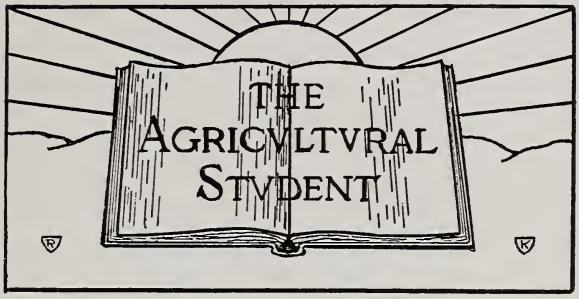
The dairy is one sure method of building up any farm.

Blackburn students are beginning to realize that it is up to the dairyman to beat the "high cost of living," and that the dairyman is able to do it if any one can. We made a number of careful estimates last year on the cost of producing a gallon of milk. With the total cost of operating our dairy, feed for growing stock included, we produced milk for less than 16 cents a gallon. This year we believe that it will be less than 20 cents with the high prices of feeds. We had individuals in our herd whose accounts showed that they produced milk at less than 8 cents a gallon. In both cases the feeds were figured at market prices.

The policy of our dairy farm in a nut shell is this—bring up the fertility of our farm through the use of farm manures, fertilizers and legumes, so that we can produce silage for our herd the year around; enough corn to grind up for the meal and to feed the horses; enough hay for our demands; besides some extra which will buy the bran and oats we use; then as our feed production increases we can increase our herd accordingly. We believe that we will soon be able to keep a cow for one year on less than two acres.

You have not thot much in reading this article of the serious task which these Holsteins have to do. You have listened to the story of how a dairy farm is operated. The experiences these boys have in caring for this herd, the conditions under which they work and succeed, makes the future brighter for they are able to go out from us and secure work in better equipped dairies and give complete satisfaction. We have had the pleasure of recommending our students for these places and have been more than paid by the way they are making good. The "old" cow has given them the experience and at the same time must have instilled in them her own policy of "keeping everlastingly at it or you won't make an A. R. O."

Group of Farmers at the Ohio Agrcultural Experiment Station



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EDITORIAL

FUTURE OF DAIRYING

We believe that the dairy industry has a promising future in American agriculture. Investigations and experience have shown that milk is one of the most nourishing foods produced. Both the protein and the fat are essential to the growth of the young, and grown people are fast learning of the good qualities of fresh, clean milk.

Cheese has been shown to be more nutritious than meat and just as sustaining to the laboring man. One hundred pounds of skim milk has as much nourishment as fifteen pounds of beef. A cow that produces 7000 pounds of milk in a year makes as much human food as three steers will produce and raises a calf besides. This amount of milk will make about 1000 pounds of cottage cheese which is equivalent to 1000 pounds of meat. The people of Europe have long recognized the value of cheese for all clasess. They have used cheese as a food and not as a relish. One pound of American cheese is nearly equal in food value to two pounds of beef.

The people of the United States are being taught as never before the relative value of foods and the function which each performs. This means that the people will finally buy foods on the basis of their food value and palatability. As a result, the dairy products which are cheaper and far more nourishing will soon replace a great part of the meats in the diet of the American people. The dairy farmer surely has a promising future because he is in a growing industry.

PROVIDE STORAGE ROOM

Better grain storage on the farm is one of the demands made by these times of high priced food products. It does not pay to produce and then needlessly waste a large part of the products. Many acres of oats were still standing in the shocks the first week in September this year. Undoubtedly much of the grain was entirely ruined by the many rains and all of it was bleached to some degree. If this grain could have been stored under a roof much more would have been saved and it would all have been of a higher grade. Much of that which was threshed from the fields either had to be sold at a low price or stored in nearby elevators because of the absence of granaries on the farm.

The independence of the farmer is not measured by the amount he produces but by his ability to care for the crops and sell them at the greatest profit. The building of storage room sufficient for all crop production should be a matter of serious consideration on every farm. The period of needless waste has passed; the old time methods of cribbing or piling corn on the ground with a few forks of hay or some bundles of fodder as a roof has no place on a modern farm. Likewise the rat-eaten granaries and the leaky roofs are not sufficient for the protection and storage of grains that have doubled in price in a few months.

The farmer should now be in a position to say when he wants to sell his grain. It is his own fault if he is not and he must suffer the results of his neglect to provide storage for the grain until the price seems proper. Granaries and cribs can be erected that are rat proof and well ventilated so that there will be no loss or depreciation in quality during storage, and the congested condition of freight traffic makes it imperative that the farmer be prepared to hold the crops. It is not too late to provide proper corn cribs nor too early to plan for the storage of grain crops for next year.

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VALUE OF GROUND FEEDS

There is some difference of opinion as to the increased value of ground feed over the unground, generally caused by the varying conditions under which the feeding is done. Hog feeders and cattle feeders usually prefer to use the whole grain, especially corn, because the cattle and hogs are fed together in the same enclosure so that the hogs can take up the waste and undigested grain. This plan of feeding cheapens the cost of handling and is believed to eliminate more waste than any other method.

In the case of young or old animals ground feed may be made to carry them thru a season when whole feed would have been useless. Young lambs and calves should be given ground feed and pushed as rapidly as possible because gains are greatest and most profitable at that time. But young pigs soon learn to crack corn and will grow and develop well if they are fed a little ground grain in the slop.

The milk cow is greatly benefited by the feed grinder. Chopped and ground feed from the various feeds grown on the farm are endorsed by all dairymen and are well adapted to milk production. Ground feed scattered over silage satisfies the cows as nearly as possible and forms a ration that fills the pails. Is the farm feed grinder an economical proposition for cheapeuing and bettering the feeding of live stock on the farm?

The answer can best be given by those who have owned and operated

them for years. Nearly all will say that they would not be without one. Because some indifferent farmer owns one and does not use it is no reason to suppose that it is not a good investment. The same farmer is likely to be feeding his hogs in the mud and throwing hay out on the soft ground to be tramped under foot by the cattle before they eat it. Suitably prepared food that is properly proportioned and distributed so that it will be clean and palatable is one of the fundamentals for profitable live stock management.

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SUPPORT YOUR ORGANIZATIONS

Farmers' organizations in every rural community need the support and attention of all those interested in better agriculture. We have become so accustomed to living our own life without outside associations that it is hard to broaden and live for the benefit of others as well as ourselves. But after becoming identified with some organization we must keep up an active interest in order to receive the benefits of it.

Every county has some need for an organization peculiarly its own, and every township in that county may have a different need but each can form a part of the whole and all be working in perfect unison. Possibly your county or township already has a farm bureau association, a cooperative elevator, a farmers' telephone system or some other farmers' organization. Are you supporting it and giving a part of your labors for its benefit? It should be a growing organization as a result of the concentrated efforts of yourself and neighbors. Do not expect it to thrive unless some one is making some sacrifices. For the sake of your county or township, for the sake of yourself and farm, keep the organizations busy because they will soon die out if there is nothing to do.

The social side of such organizations is one of their beneficial results. Getting together, meeting people, and exchanging experiences are the most broadening influences that come into the farmers' lives. As we meet more people we become richer in experience, friends become more numerous and life is broader in all its varying attitudes. Remember that you need your neighbor as badly as he needs you.

Many farmers try to do two years of work in one and they have no time for social development, entertainment or cooperative work with neighbors. If you belong in that class slow up a little and take time to improve yourself, increase your friends and support the farmers' organizations, thus making yourself appreciated in your community.

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LET HOGS HARVEST CORN

The corn crop can be harvested more economically by hogs than by any other method. Practical feeders and experiment stations have demonstrated this fact many times. Of course the hogs must be properly managed to secure the best results but this does not require long experience as one can profit by the experiences of other feeders.

After the hogs have been on a good pasture during the summer they are in just the right condition for quick gains in the corn field. Most feeders prefer well-grown, thin shoats that weigh from 125 to 150 pounds because they eat large amounts and make rapid gains. If heavy hogs are used they waste much of the grain and some smaller ones should be used to clean up all of the corn.

Some nitrogenous feed should be supplemented with the corn to secure the

most economical gains. This can be supplied by the clover or alfalfa field which has been abandoned for the season. Rape or soy beans sown in an adjoining field furnish the best supplement. If none of these can be had tankage or middlings should be given in the slops. The particular supplement will always depend upon the relatives prices and feeding value.

This fall, when labor is so high and hard to get or keep, will be a particularly good time to let the hogs harvest part of the corn crop. This system of hog management not only reduces the amount of labor but also the amount of grain, removes less fertility from the farm, keeps the swine more healthy and offers other advantages for lessening the cost of production.

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BUSINESS OF DAIRYING

There is no use to deny that there is drudgery in dairy work. It requires constant attention every day of the entire year and a person who can not settle down to hard steady work has no place on a dairy farm. Many have quit the business because of this but it may be said that it was a good thing for them as well as for the dairy because a misfit never does efficient work. The first thing for any one to consider after they have decided to enter into dairy work is

Starting the Herd

It is usually advisable to let any business grow with experience so the dairyman starts with a few well chosen young heifers and breeds them to the best pure bred bull he can find. By saving the best heifer calves the herd can gradually be increased and improved but there can be no guess work here and the

Scales and Tester

must be used on every cow. It requires only a few minutes each day to keep the milking records of every cow and by the use of the tester one is able to weed out the unprofitable cows. Your best looking cow will not always be the best producer and your highest producing cow will not necessarily be the most profitable. You must depend upon the scales and tester but if you do not know the amount of

Feeds Consumed

they are of little use, so there must be scales in front of the cow also. These will tell you the amount of feed given each cow. From these weights you are able to compute the cost of feeding each cow and also to determine whether or not you are giving a

Balanced Ration

This is another necessity if the business of dairying is to be built on efficiency. Experiments have shown and dairymen are learning that the proper amounts of proteins, carbohydrates, fats and dry matter must be used if the best and cheapest results are obtained. But the herd and the feeds must be kept in

Proper Buildings

that are sufficiently lighted and ventilated, easy to keep clean and planned to save labor. In this day of high-priced labor every building should be so arranged as to make the least amount of labor do the greatest amount of work. Stables, feed bins, mows, separator rooms and everything about the dairy should be arranged for cleanliness as this is one of the essentials in the dairy business. In planning the buildings

The Silo

should always play an important part. It has taken a permanent place in this business of dairying and has solved many of its problems. Wherever the dairy industry is growing, the silos are dotting the country and where the silos

are the prosperity of the farmer is assured. If you are looking for permanent steady work with an increasing market for your products turn your efforts to the dairy business.

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SAVE THE SKIM MILK

One of the greatest wastes of the American public consists in the failure to recognize the true value of skim milk. Many people, including housewives, think that the value of whole milk lies in the cream and that the skim milk is only a filler. It is not generally known that skim milk is just as valuable pound for pound as ordinary cream, but it sells much cheaper because it does not look as nice and does not have the same pleasant flavor.

All of the constituents of whole milk are found in skim milk excepting the fat which has only a heating value. Nevertheless skim milk is seldom offered for sale except for hogs. When milk is 10 cents per quart, 7½ cents are for the cream and only 2½ cents are for the large amount of skim milk. Certainly dairymen are overlooking a great opportunity when they do not attempt to sell their skim milk in the cities as it can be sold for less than one-fourth the cost of inferior muscle-building meats.

Skim milk can be used as a substitute for whole milk if a cheaper form of fat is used to replace the butter fat. When whole milk is selling at a given price about one-half of that price will usually buy skim milk that will furnish the same amount of energy and twice as much building material.

So long as the nation feeds millions of gallons of skim milk to hogs there should be no complaint from our national authorities about the scarcity of meat.

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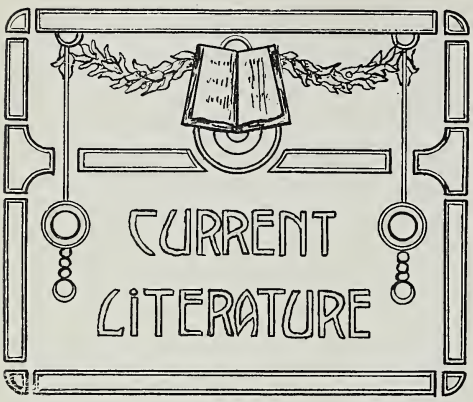
APPLY LIMESTONE NOW

The most convenient time to apply ground limestone is in late summer or early fall. It is at this time that there is the greatest leisure of men and teams, the roads are good and the fields are dry enough to go over without serious damage. Another reason for applying lime in the fall is that it is always best to put it on land prepared for a crop and the wheat ground offers the best place for this because farmers are usually too busy or the ground is too soft to apply it before corn.

Clover, which usually follows wheat, is the crop most benefited by lime. Hence the need of applying lime on the wheat. But, since lime is applied to sweeten the soil and thus influence all crops it does not matter greatly to which crop it is applied. This must be influenced by the labor supply and the condition of the fields.

There is a prevailing opinion that since lime does not give the quick response secured from fertilizers that it is not a good war measure application. This is partly true but since the war may last indefinitely the period of food shortage will doubtless continue several years and every measure which will increase soil productivity should be considered. The use of lime should steadily increase because it is essential to the growth of clover on many soils and the clover is our cheapest and best source of nitrogen.



"Manual of Milk Products" is the title of a recent book written by W. A. Stocking of the Cornell University, that has been prepared for the purpose of bringing together the work of the best authors so as to meet the needs of students and men in commercial work. The composition, secretion and physical properties of milk are fully treated, followed by a discussion of testing and preparation for the markets. Butter making and certified milk each occupy a chapter. Methods of making all kinds of cheese, condensed and fermented milks, and ice creams are explained. The last chapter deals with the relation of bacteria to dairy products. 573 pages, 100 illustrations, $2.00. The Macmillan Company, New York City.

"Principles and Practices of Pruning," by M. G. Kains is the title of a book which has been prepared to meet the needs of practical and amateur growers and students of horticulture. The author discusses the principles and philosophy of pruning followed by a chapter on buds. How wounds heal and the repair of mechanical injuries are fully explained. The chapters on pruning nursery stock, young trees, and odd methods of pruning will be attractive to amateurs. In order to meet the needs of those who have neglected to repair the trees there are chapters on rejuvenating old trees and practical tree surgery. 400 pages, 300 illustrations, $2.00. Orange Judd Company, New York City.

"The Manufacture of Ice Creams and Ices," by J. H. Frandsen and E. A. Markham, of the University of Nebraska, is a complete discussion on the subject of frozen desserts. Preparation of the frozen products is fully explained from the supply of the cream and its care at the factory down to the flavoring and mixing in the freezer. Standardization and stabilizers each make up an important chapter, Formulas are given for all kinds of ice creams, ices and sherbets. The freezing process and the operation of the refrigeration plant are fully explained. Special attention is given to the ice cream factory, its location, management and by-products. The appendix contains standards, standardizing tables, sanitary codes and rules for calculating the speed of pulleys. 315 pages, 103 illustrations, $2.00. Orange-Judd Company, New York City.

"Judging Farm Animals," by Charles S. Plumb, was prepared not only for the student but for the stockman. The main body of this book is preceded by a study of "form and function," after which each class of animals is discussed separately so that you can read just the particular one in which you may be interested without going thru the whole book. Horses, cattle, sheep and swine are treated separately, special attention being given to judging of the various classes of these four breeds. The appendix contains rules governing judging contests and the classification in the show ring. 590

pages, 299 illustrations, $2.25. Orange-Judd Company, New York City.

"Interior Decoration for the Small Home," by Amy L. Rolfe, of the University of Montana, contains practical suggestions for the average home upon the subject. The arrangement of decorations for the walls, windows and floors so as to secure the most pleasing effects is explained and directed. The use of rugs and carpets for decoration will be well understood after reading the chapters on this. Ancient and modern furniture, fireplaces and lighting systems are compared as to their utility and aesthetic value. 146 pages, 30 illustrations, $1.25. The Macmillan Company, New York City.

"The Rural School from Within," by M. G. Kirkpatrick, is one of the few books on education that has a combination of instruction and literary enjoyment. Principles of pedagogy are interwoven in a fascinating narrative which will appeal to the teacher, parent and student. Managing the boys and girls as well as the school board, promoting rural improvements, and solving the community problems are some of a teacher's difficulties that are treated. This book was written after many years of experience and the suggested improvements that make up one chapter should be helpful to all those interested in better schools. 303 pages, $1.28. J. B. Lippincott Company, Philadelphia.

The following list of publications will be of interest to farmers and students:

Farmers' Bulletins

No. 824 How to Select Foods Rich in Protein.

No. 873 Utilization of Farm Wastes in Feeding Live Stock.

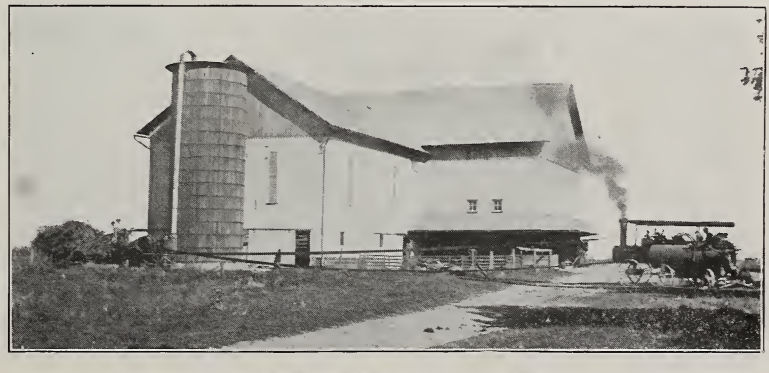
No. 879 Home Storage of Vegetables.

No. 871 Fresh Fruits and Vegetables as Censervers of Other Staple Foods.

No. 847 Potato Storage and Storage Houses.

Circular 62 of the Purdue University, at Lafayette, Indiana, on "Hog Cholera Control."

Bulletin 153 of the Utah Agricultural Experiment Station at Logan, Utah, on "Selecting Dairy Bulls by Performance."



Getting Ready for Winter

HOW TO CAN FRUITS AND VEGETABLES

FLORENCE WEST. '19

IN former times every thrifty housewife filled the shelves of her store closets with rows of preserves, jams and jellies but she never thot of canning the common garden vegetables for winter use on the table. That is why we step ahead instead of going back to the days of preserving, for with the cold-pack, one-period method we can add all kinds of vegetables, soups, and meats to our store closets.

The principle in canning is to kill the yeast, bacteria and molds in the vegetables, fruit, water and air in the jars by sterilizing them a certain length of time, wth the jar partially sealed. Immediately after the jar is removed from the hot water bath the lid must be tightly sealed so that the contents may not come in contact with the live yeast, bacteria or germs in the air.

There are many kinds of canning outfits on the market from which to choose —commercial hot-water-bath outfits, water-seal outfits, steam-pressure outfits, pressure cookers and last but not least the home-made outfits. The home-made outfit should consist of an ordinary wash boiler, with a well fitting cover, a tray or rack n the bottom to hold the jars so as to permit a free circulation of water under them, a wire rack and several yards of cheese cloth to use in blanching, several acid proof pans for handling and blanching acid fruits, two tablespoons, a set of measuring spoons, a duplex fork to lift the jars and a generous supply of hot and cold water.

There are 8 steps to take in canning by the cold-pack method.

First—Prepare and clean containers. Glass jars should be carefully washed and placed in a kettle of cold water, placed over the fire and brought to the boiling point. After boiling for a few minutes they are removed and the vessel covered and set in a hot place. In this way the jars remain hot and do not take up valuable stove room.

Second—Prepare fruit or vegetables such as stringing beans or paring apples.

Third—Blanch vegetables or fruits. Place the product in cheese cloth or a dipping basket put in boiling water and allow them to remain from 2 to 15 minutes after the water begins to boil depending on the product to be blanched. Greens or green vegetables may be blanched by placing them in cheese cloth and hanging them inside the boiler in steam.

Fourth—Cold dip fruits or vegetables. To do this take the product immediately after it is removed from the boiling water or steam and quickly dip it in cold water—the colder the better. Remove almost immediately and allow it to drain for a few minutes.

Fifth—Pack the cold product into hot jars, place on rubbers which have been sterilized in boiling water for about 3 minutes.

Sixth—Fill fruit jars with boiling syrup. Fill vegetable jars with boiling water and add one level teaspoon of salt to each quart jar.

Seventh—Put on lids. Partially seal and place in boiling water or steam for the length of time indicated for the kind of fruit or vegetable. Be sure to cover the jars with boiling water at least 2 inches over the top of the jars.

Eighth—Remove the jars and seal tightly while hot. Place on tray upside down and allow to cool out of the way of drafts. Examine closely to

see if the jars leak. If leaks occur and cannot be corrected by tightening the lids, remove the covers, place on new rubbers and sterilize again for three-fourths of the original time. If it is possible can the vegetables the day they are picked. Peas, lima beans and corn should be canned within 5 hours after they are gathered.

Blanching and cold dipping fruits and vegetables sets their color. All products should be graded for size or ripeness. A few old peas or beans in a jar may spoil the entire can.

Tomatoes are an exception to the general rule. No water should be added to the jars which contain them. It is only necessary to place the whole tomatoes tightly in the jars and add a level teaspoon of salt.

The cold-pack method of canning fruits is the same as that used for vegetables with a few exceptions. The time of blanching is shorter, being from 1 to 5 minutes, according to the hardness of the fruit. Also the time of sterilization is less for fruits.

Do not remove covers from jars and attempt to fill the jars after you remove them from the hot water bath. If the product has shrunk do not make any attempt to refill. It is not necessary for it is a sterilized vacuum and the product will not spoil.

THE HOME MAKERS CLUB

JULIA SMITH, '17, Assistant in Agricultural Chemistry

UNDER the supervision of the extension department of the Ohio State University, homemakers' clubs for girls between the ages of 10 and 18 have been organized in nearly every county in Ohio. The primary object of the clubs is to interest the girls in the elementary domestic science problems which will keep their interest in the homes. The clubs are organized in communities in which the schools do not give regular home economics work. They are often organized in rural schools under the leadership of the teacher or they may be organized independent of the schools under the supervision of any interested person.

In the rural schools the lessons often consist in the preparation of a warm dish which may be eaten with the cold lunches. When the clubs are not organized in connection with the schools, the dishes are usually prepared at home, then planned and discussed in meetings. Recreative and social pleasures also make up a portion of the club activities.

Nearly 4500 girls are taking part in the work in this state. During the summer of 1917 the clubs have been especially engaged in the conservation of food products. Members of the extension department visited each club twice during the summer and gave instruction in the canning and preserving of fruits and vegetables, also in bread making. By the aid of the girls many housewives have preserved fruits and vegetables that otherwise would have been wasted. The girls have shown a truly patriotic spirit in thus doing their "bit."

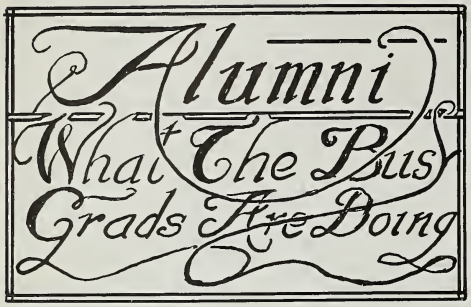
Careful experiments show that home baked bread is less expensive than bakers' bread. However in many homes the labor and time involved in bread-making compels the housekeeper to buy her bread. If the daughter of the house can assist in bread-making and thus relieve the household of the

extra labor and expense she is learning some valuable lessons. The bakers do not generally practice the sale of bread which is made from a mixture of corn and wheat flours or whole wheat bread. These breads are wholesome and can be prepared by the girls.

If we would extend our supplies of grains to the limits we must practice the more complete utilization of the wheat kernel for human food. Usually only 71-80 per cent of the wheat kernel is milled into flour. We can also save our wheat supply by substituting the other flours in part. These facts have been explained clearly to the club girls and we hope their assistance in these methods may be felt in our markets.

Each club girl is encouraged to exhibit at the county fair. These exhibits consist of three kinds each of canned fruits, vegetables, jelly, rhubarb conserve and bread. The exhibits are made under the supervision of the county superintendent of schools and judged by a member of the extension department. The prizes for these exhibits consist of money awards, a trip to Washington with the corn boys or to Columbus during Farmers' Week.

In the Famous Potato Region, Aroostook County, Maine



Herbert L. Andrew, '15, who has been acting superintendent of the Hamilton and Clermont county experiment farms since July 1, has accepted an appointment as county agent in Auglaize county, and began work on September 1. He has been employed by the Ohio Agricultural Experiment Station in the department of farm management since graduation. During the last summer he was the special county agent in Shelby and Auglaize counties.

Norman A. Ley, short course, '17, is doing work in market gardening near Dayton, Ohio.

Fred E. Perry, '14, is now farming near Leipsic, Ohio.

Byron M. Hendrix, '09, is a chemist in the medical laboratories of the University of Pennsylvania. He is located at Philadelphia, Penn.

Charles E. McAnall, '15, is farming at Mt. Gilead, Ohio.

Bert Miskimen, '08, is engaged in farming near Newcomerstown, Ohio. He is in the cattle and sheep feeding business.

V. A. Place, '12, is county agent of Wabash county in Indiana. His address is Wabash, Indiana.

H. W. McChesney, who was circulation manager on The Agricultural Student last year, will farm near Akron, Ohio next year. He spent the summer on the farm of Charles Sprague at Lima, Ohio. Mr. McChesney will engage in the production of pure bred hogs and chickens.

Samuel R. Guard, '12, is on the editorial staff of The Breeders' Gazette at Chicago, Ill.

Lewis L. Heller, '12, who was formerly with the United States Department of Agriculture at Washington, D. C., is now located in New York City.

Dana G. Coe, '17, who was on the staff of The Agricultural Student last year, has accepted a position as instructor of chemistry in the high school at Tiffin, Ohio.

Ralph D. Seif, '17, is farming at Galion, Ohio.

Karl Hern, '14, is farming near Spencerville, Ohio.

Selwyn B. Ewing, '17, is engaged in farming near Vanlue, Ohio.

Thomas B. Foster, '06, is county agent for Highland county. His address is Hillsboro, Ohio.

Sylvan H. Shawhan, '07, is engaged in general farming near Xenia, Ohio.

Walter E. Foster, '16, farms near Thornville, Ohio. He feeds a large number of sheep every winter.

George L. Cassell, '17, is farming at Mt. Vernon, Ohio.

J. K. Mustaine, who was in the college from '75 to '78 ,was one of the interesting visitors at the booth of The Agricultural Student at the Ohio State Fair. He is farming near Bellefontaine, Ohio.

Crawford M. Morris, ex-'12, is farming at Shandon, Ohio.

George L. Brown, '17, who was on the staff of The Agricultural Student last year is now farming near New Lexington, Ohio.

Clayton H. Elliott, '16, is farming at West Mansfield, Ohio. He is giving special attention to the feeding of sheep.

Guy E. Johnson, short course '15, is farming near Westerville, Ohio.

Harrison W. Zuercher, '16, who has been farming since graduation, has been selected to teach agriculture and coach athletics in the high school at Creston, Ohio. He was on the staff of The Agricultural Student while in school.

Eugene Budd, '17, is another one of the staff of The Student to secure a position as teacher in a high school. He has been elected to teach at Prairie Depot, Ohio.

Merle S. Klinck, '16, has been selected as an instructor in the agricultural school at Alfred, New York. He will teach agricultural engineering and shopwork.

Byron E. Pontius, '14, is instructor in animal husbandry in the agricultural school at Alfred, New York.

Ray F. Donnan, '14, who is now county agent in Lucas county, was one of the visitors at the booth of The Agricultural Student at the Ohio State Fair.

J. R. Allgyer, '17, who was working for the Council of National Defense during the summer, has been hired to teach agriculture in the high school at Plattsburg, Ohio, for the coming year. He will also be giving part of his time to the Boys' and Girls' Club Work of the extension department.

Jesse E. Oakley, '17, who was one of the associate business managers on The Agricultural Student last year, was in the officers' training camp at Fort Benjamin Harrison and has received a commission as lieutenant.

Carl C. Lowe, '17, who was in the training camp at Fort Benjamin Harrison, is now a lieutenant in the reserve army at Chillicothe.

Uri Bruning, '16, is farming near Bradner, Ohio.

Charles L. Thrash, '17, has returned to the university to take a Master's degree in the department of agricultural chemistry and soils after spending the summer on the farm. He will do some teaching in this department also.

R. W. Smith, '17, did cow testing during the summer but has been drafted for the reserve army. He was on the staff of The Agricultural Student last year.

Luman Taylor, '17, is farming at New Paris, Ohio.

Earl E. Barnes, '17, spent the summer on the home farm at Waterford, Pennsylvania. He has returned to the university to take work for a Master's degree in the department of agricultural chemistry and soils. He will also teach in this department.

Brenton C. Zimmerman, '17, who was assistant business manager of The Agricultural Student last year, has entered the University of Missouri to take work for a Master's degree.

Clifford T. Conklin, '16, who has been employed in the extension department will begin teaching in the animal husbandry department of the Ohio State University this year.

Thomas L. Guyton, '13, will not return to the university to teach this year, but will remain at the Ohio Agricultural Experiment Station, where he has been employed during the summer.

Orville A. Jamison, '12, is teaching dairying in the Massachusetts Agricultural College at Amherst.

Ernest J. Riggs, '96, will be married to Miss Naomi Haber in the early fall. Miss Haber has been a stenographer in the office of Dean Vivian.

Edward Kirkendall, '14, who has been engaged in the extension department of Purdue University at Lafayette, Indiana, has received a commission in the United States Army as lieutenant.

OCTOBER NEWS FOR SCHOOL AND FARM

NEW INSTRUCTORS IN SOILS

A. A. Olsen has been employed as an assistant in the department of soils for this school year. He is a native of Kendall county, Illinois, and was graduated from the University of Illinois last June with the degree of Bachelor of Science in Agriculture.

J. J. Riggle will also be one of the assistants in the department of soils for the school year. He was born in Tyler county, West Virginia, and received the degree of Bachelor of Science in Agriculture from the University of West Virginia in the class of 1917.

ON LEAVE OF ABSENCE

Thomas G. Phillips, who graduated from the Ohio State University in the class of 1912, will attend the University of Chicago this year. Mr. Phillips has been an instructor in the department of agricultural chemistry since graduation.

REENFORCE MANURE FOR WHEAT

Manure reenforced with either acid phosphate or raw phosphate rock may be the only plant food added to wheat following corn this year, according to the Ohio Agricultural Experiment Station. Increased crop yields have far more than paid for this fertilizer in experimental tests.

Wheat seeding is hurried after the corn crop is cut in a corn-wheat-clover rotation so fertilizers may be added after the crop is sown. A few tons of manure per acre mixed with acid or raw rock phosphate will give good results.

Manure has had a value of $3.65 a ton in increasing crops yields in such a rotation at the Wooster Station for 17 years but this has risen to $4.48 by the addition of 40 pounds of raw phosphate to each ton of manure and to $5.41 by the use of the same quantity of acid phosphate.

GUERNSEY MAKES RECORD

Follyland Nancy 52457, a 2 year old Guernsey heifer bred and owned by I. C. Bland, of Greenwich, New York, has completed an official year's record of 12270.9 pounds of milk and 712.6 pounds of butter fat, her average test being 5.81 per cent. Three weeks after finishing her record she dropped a heifer calf.

Follyland Nancy

Her dam, Langwater Nancy 28943, has three official records and is now making her fourth. During the first 6 months of her fourth record she has produced 556 pounds of butter fat, which is 3 pounds more than Murne Cowan, the world's champion, produced during the same period.

STUDENTS' JUDGING CONTEST

The annual students' judging contest at the State Fair was held on Tuesday. Jerseys, Galloways, Poland Chinas, Yorkshires, Shropshires and Belgians each formed a ring for the judging. These were furnished by different ex-

hibitors at the fair. Professors Joel Coffey and Schuyler M. Salisbury acted as judges.

The result of the contest was as follows: Horses—First, W .L. Hammond; second, V. G. Applegate; third, J. R. Bullard. Cattle—First, Frank Patten; second, W. L. Hammond; third, J. R. Bullard. Swine—First, M. V. Bailey; second, W. L. Hammond; third, C. H. Sprague. Sheep—First, V. G. Applegate; second, M. V. Bailey; third, W. L. Hammond.

POULTRY SHOW HERE

Leghorns will be the only breed at the poultry show to be held in Columbus, November 28 to December 3. This is the first show of the kind that was ever attempted and it will be held under the auspices of the Ohio Leghorn Club, which has headquarters at Cuyahoga Falls. It is expected to bring fanciers and fowls from all parts of the United States and Canada. Prof. M. C. Kilpatrick, of the extension department, is one of the committee in charge of the show.

CORN SUBSTITUTES FOR HOGS

Farmers can reduce the amount of corn fed to hogs by substituting other feeds. This is especially desirable with high priced corn and its increased need for human consumption. Pastures and forage crops properly used can reduce the corn and other concentrated feeds from one-half to one-fourth and there are many feedstuffs which can be substituted for the other portion of corn. Their use will be determined largely by availability, relative feeding value and cost per pound as compared to corn. By getting in touch with the feed manufacturing industries hog feeders may discover profitable substitutes for corn but feeds unavailable for human consumption should be used as far as possible.

DAIRY CAMPAIGN

A campaign to have every drop of milk produced in the United States make the fullest possible contribution to the food supply of the country has been started by the dairy division of the United States Department of Agriculture. This will be caried on by funds made available by the food production bill. At present much skim milk and large quantities of other dairy and creamery by-products are fed to farm animals when a considerable portion of this might more advantageously be made directly into food for human consumption. Whole milk, skim milk and cheeses are cheap forms of food and their high protein content makes them useful substitutes for meats.

BACK TO THE FARM

The farm has claimed another one of the teachers in the college of agriculture. Mr. Fred J. Salter, who graduated from the college of agriculture in 1913, has left the college to farm in southern Indiana. He has been an instructor in the department of agricultural chemistry since graduation.

MISSOURI UNIVERSITY COWS

Five cows in the dairy herd of the college of agriculture at the University of Missouri have made a record of more than 20,000 pounds of milk in a year. Fifteen cows have made records of more than 700 pounds of butter in a year. There are 96 cows in the herd, of which 41 are Holsteins, 36 Jerseys, 13 Ayrshires, and 6 are Shorthorns.

THE CORN EAR WORM

The corn ear worm does a vast amount of injury each year to garden and field crops. It is practically the only insect which injures the ears of field corn and is the worst pest of sweet corn. This worm also does considerable damage to tomatoes by boring into the green and ripening fruit and is known to the grower as the tomato fruit worm; it is also called the tobacco bud worm.

The full grown worms are variable in markings and color but usually they are a dull greenish or brownish color with indistinct stripes or spots and are about 1½ inches long. When the worm becomes full grown it burrows down into the soil about 3 inches and constructs a tube nearly to the surface of the ground for the use of the moth which will come out later. Here it changes to the pupa and passes the winter in this condition.

One of the best means of control is

fall plowing and harrowing or disking in order to break up these opening tubes. This also brings the pupa nearer to the surface where the alternate freezing and thawing will have a greater effect in destroying it.

WISCONSIN TESTING CLUBS

Wisconsin now has 83 cow testing associations, enrolling 40,639 cows and 2,477 members. Forty-four of these associations were organized before July 1, 1916, and 39 within the past year. The last 12 months have brought an increase of 60 per cent. in the number of associations.

SPRAY TREES THIS FALL

Fall spraying after the leaves of fruit trees have dropped may be substituted for the usual dormant spraying, and orchardists will thus overcome the difficulties of handling freight and obtaining labor in the spring. Unless San Jose scale is extremely bad it can be controlled practically as well by fall operations as by deferring the work until spring, acording to entomologists of the Ohio Agricultural Experiment Station.

Heavy spray tanks are more easily hauled over firm ground in the fall than over soft ground in the spring and men and teams are more available also. Insecticides and any required machinery should be ordered now for the November spray.

INCREASE COUNTY AGENTS

Plans have been made to expand the cooperative extension work of the United States Department of Agriculture and the state agricultural colleges by a large increase in the number of county agents and home demonstration agents. Women agents will be placed

in the larger cities and towns for the first time. More or less technical training will be required and the appointments are to be made on the recommendation of the director of extension work at the state college. The plans contemplate the extension of the men county agents to all the rural counties of the Union in which there is a need for the work and the placing of an additional agent in some of the counties already organized. The number to be employed will depend upon the number of trained men and women available as proved ability in leadership as well as technical training will be required.

AYRSHIRE CHAMPION

Willowmoor Vesta 4th 34250 has finished her junior 4 year old Advanced Registry test with a year's record of 17755 pounds of milk and 753.18 pounds of fat, which entitles her to the world's championship in her class. She belongs to the Robin Hood strain and was bred by J. W. Clise, Redmond, Washington, but was tested by E. B. McFarland, of California.

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BARRACKS TO BE BUILT

The state emergency board has granted an appropriation of $80,000 to build wooden barracks for the Ohio State University Aviation school. Two frame buildings accommodatig 400 students, a machine gun range, and a laboratory building will be built.

After the war the barracks may be used as a dormitory for college students who will be forced to live there under military discipline during their first year in school.

Archie J. Bishop, '15, is farming near Delaware, Ohio. He is giving special attention to the breeding of horses.

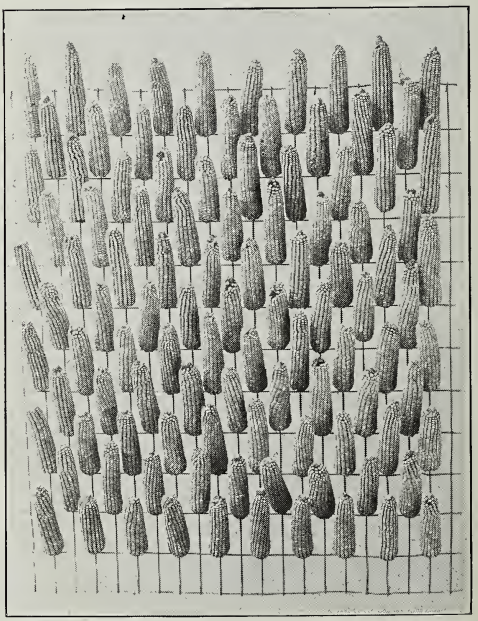
Lester J. Lane, '13, is farming near Wilmington, Ohio.

C. E. George, '15, is employed in the State Dairy and Food Deparment. He is located at Delta, Ohio.

Charles E. Snyder, '09, who was editor of The Agricultural Student in 1908-09, is now editor of The Farmers' Review, published at Chicago, Illinois.

Franklin P. Stump, '92, who was one of the originators of The Agricultural Student, is now farming and breeding pure bred cattle and hogs at Convoy, Ohio. He was foreman of the university farm for three years.

Edwin L. Shaw, '02, is employed in the animal husbandry division of the United States Department of Agriculture. He has been located at the University of West Virginia at Morgan town as an extension worker in sheep husbandry in cooperation with the government work. Mr. Shaw is one of the well known sheep authorities and judges of the country.



One Way to Keep Seed Corn